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EDITORIAL

Research for industry

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Introduction

Petrochemical production accounts for a 6% of global energy consumption. Although this seems like a small percentage, in absolute numbers it is close to 30 EJ, i.e. 3×10^{19} J. Consequently, industrial application of petrochemical research has a meaningful impact on the global economy and on the environment.

Although the justification for petrochemical research in both industry and academia is clear, one may rightfully ask: why do we need yet another journal? The answer lies in the name: *Applied Petrochemical Research*. There are journals dealing with the many disciplines that support petrochemical research, such as catalysis, conversion chemistry, chemical engineering and material science. There are also journals dealing with the products from petrochemical research, such as polymers, lubricants and pharmaceuticals. However, *applied* petrochemical research requires integration across disciplines and products, even though studies may focus on only specific aspects. Applied studies do not have the same resolution of detail as discipline specific studies, but the relevance of applied studies is immediately apparent to practitioners that want to translate the research into actual processes and products. By its nature, *Applied Petrochemical Research* is home to multi- and inter-disciplinary research dealing with petrochemicals, as well as single discipline studies that are of a more applied nature.

What is petrochemical research?

It is difficult to separate petrochemical production from fuels refining. Petrochemicals are produced mainly from crude oil, either downstream from fuels refining, or integrated with fuels refining. Petrochemical products can range from large volume products such as plastics, lubricants and solvents to speciality and fine chemicals such as cosmetics, flavourants and pharmaceuticals. In most cases, the products are synthesized from a much smaller group of intermediate commodity chemicals. Based on production volume, the main commodity chemicals that are employed as building blocks are ethylene, propylene, butenes, benzene, toluene, xylenes, methanol and ethanol. Petrochemical research encompasses feedstock production, conversion processes and petrochemical products (Table 1).

Topics of specific interest

The breadth of petrochemical research that falls within the scope of *Applied Petrochemical Research*, makes it difficult to enumerate the topics that are of potential interest. The topics that are being highlighted are aspects of petrochemical research where we hope to stimulate specific interest and hope to encourage potential authors to consider submissions to the journal:

(a) There is considerable diversity in petrochemical production. The scope of research relevant to petrochemical

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Table 1 A selection of typical topics in petrochemical research

Feedstock production	Conversion processes	Petrochemical products
Olefins (ethylene, propylene, butenes, etc.)	Cracking	Polymers and plastics
Aromatics (benzene, toluene, xylenes, etc.)	Reforming and aromatization	Synthetic rubber
Oxygenates (methanol, ethanol, propylene oxide, etc.)	Isomerisation	Agrochemicals
Paraffins (*n*-alkanes, waxes)	Dimerization and polymerization	Lubricants
	Hydroprocessing	Speciality and fine chemicals
	Aromatic alkylation	Pharmaceuticals and health care
	Oxidation	Solvents
		Detergents

production is vast and the need for up to date information to avoid duplication of effort is acute. *Technology reviews* of areas that are pertinent to petrochemical production are welcomed. For example, sources of propylene, ethylene polymerization technology, overview of lubricants, etc.

(b) The breadth of topics in petrochemical research naturally dilutes the research effort in any one field compared to that in fuels refining. It is not always clear whether a specific direction of investigation is viable. Although it is customary to report only on successes in research, we hope to also attract scientifically reasoned reports on failed petrochemical applications.

(c) Unlike energy applications, where non-carbon energy sources (e.g. hydroelectric and nuclear power) can be employed as alternatives to carbon-based fuels, petrochemicals are by definition based on carbon. Around 10% of current global fossil fuel (i.e. carbon) consumption is directed towards petrochemical production and most petrochemicals are produced from conventional crude oil. Sustainability is clearly an important issue and different pathways for the production of petrochemicals may have to be developed to ensure sustainability. More carbon-efficient petrochemical production from crude oil, as well as petrochemical production other carbon-based feed materials (e.g. biomass, coal, waste, natural gas) is of interest.

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